

Restoring and Protecting Public Water Supplies and Watershed Resources of the Raritan River Basin, NJ

**A Proposal from the Stony Brook-Millstone Watershed Association, the New Jersey Water
Supply Authority, and the New Jersey Department of Environmental Protection
to the United States Environmental Protection Agency**

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Provided on Enclosed CD-ROM

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Introduction: The true test of innovation is success, not the uniqueness of individual project components.

The Raritan Basin provides a unique opportunity to demonstrate and evaluate an innovative set of approaches to restore, protect and enhance water resources. It is a manageable watershed (1,100 square miles) with the full spectrum of land uses from urban to forested and agrarian. Most of the Basin is a source water area for surface water supplies. It has significant demographic diversity, and a wide variation in local efforts to protect watershed resources. The Stony Brook-Millstone Watershed Association (Stony Brook, one of the nation's largest watershed organizations), the NJ Water Supply Authority (NJWSA, a major state-owned water supply utility) and the NJ Department of Environmental Protection (NJDEP, an innovator in environmental management) provide an exciting cooperative effort to improve surface water quality using a three-prong effort of **restoration, protection, and pollution prevention** within three areas – a semi-rural area (the South Branch Raritan) that supports the state's first and third largest reservoirs; the rapidly developing suburban Route 1 corridor (Millstone River) between Philadelphia and New York; and a core urban/industrial area (Raritan/Somerville/Manville area along the mainstem Raritan River) that is just upstream of the Basin's largest water supply intake. (See attached map.) Additional partners will include NJWSA's customers and the South Branch Watershed Association; affected county planning boards and municipalities will be fully engaged in the project.

This project builds on ongoing, extensive efforts by NJWSA and NJDEP on the Raritan Basin Watershed Management Plan (to be completed in December 2002), NJWSA's Spruce Run Initiative (a cooperative effort with municipalities surrounding the Spruce Run Reservoir), and Stony Brook's powerful watershed management program using subwatershed action plans ("Action Plans"), which allow the implementation of strategies directly by landowners ranging from homeowners to businesses and municipalities, and "River Friendly" program.

This project will both drive measurable improvements to important water resources and provide an opportunity to demonstrate new approaches. First, the project will demonstrate implementation of restoration (e.g., stream stabilization/restoration for entire streams), preservation (through improved development controls) and pollution

prevention (through reduction of chemical and salt use) – individually insufficient but powerful in combination. Second, the project will demonstrate implementation in semi-rural, rapidly suburbanizing, and urbanized areas within one basin – representing dominant land use scenarios in the United States. Third, the project will evaluate use of a variety of partnerships between non-profit, governmental and private entities. The best innovation comes from effective combination of techniques, comprehensively implemented within target areas rather than implemented ad hoc. No project in New Jersey has even approached this level of comprehensiveness.

Characterization of the Watershed and Watershed Planning Effort: The Raritan Basin, which includes approximately 1.2 million people, is located in the Coastal Plain, Piedmont and Highlands regions and is comprised of sixteen HUC-11 watersheds. The Raritan Basin is already a heavily used landscape – urban, suburban and agricultural. The northeastern portion of the Basin has historic urban centers. The central and eastern areas are mostly suburban or rapidly developing; the western and southeastern areas have extensive agricultural and forested areas, but also are experiencing rapid development. Both the urban and rural centers tend to have higher minority populations and less affluence.

Impervious surfaces range from less than 5 percent to over 40 percent by subwatershed, resulting in many impacts including excessive stormwater flows. Riparian area historic losses exceed 80 percent in some subwatersheds. A total of 131 water bodies are listed for TMDL development, including 30 listings for elevated phosphorus, 43 for fecal coliform levels, and 60 for depressed biological health. (See also Appendix A.) Primary surface water quality concerns include elevated phosphorus and fecal coliform levels, pervasive upward trends in chlorides (from road salt), and turbidity (a water supply system concern). Some aquifers (especially the bedrock formations of the western Basin) are highly vulnerable to drought, and the process of suburbanization has reduced ground water recharge significantly – for some subwatersheds up to 20% in only 10 years. Each of these findings applies both to the Basin and within the project area. In short, the Raritan Basin provides within one major river watershed the land uses and associated impairments to water quality and supply that are epidemic throughout the East Coast metropolitan corridor, and much of the rest of a country beset by sprawl.

The Raritan Plan has been developed by hundreds of stakeholders from many interests (including local government, agriculture, utility, industry and environmental) and all parts of the Basin. The Raritan Plan articulates implementation strategies responding to six major issues identified by the project's Characterization and Assessment reports: **(1)** Surface water pollution; **(2)** Loss of riparian areas; **(3)** Biological impairment of streams; **(4)** Loss of ground water recharge; **(5)** Water supply limitations; **(6)** Stormwater impacts. The implementation strategies address a three-prong effort: restoration (field restorations of streams and riparian areas to improve stream ecology); protection (acquisition, development management, and best management strategies to protect existing resources); and pollution prevention (field strategies to reduce pollutant loads). Information on the full Raritan Project and Plan is available at www.raritanbasin.org. (See also Appendix B.)

Stony Brook, formed in 1949, launched the modern form of its watershed program in 1992. Based on the largest volunteer water monitoring program in the state, Stony Brook supplements the Raritan Plan by developing targeted action plans for subwatersheds of 10 to 50 square miles with identified water quality impairments. Within each area, Stony Brook convenes technical experts and stakeholders to clarify causes of impairment, and to develop detailed action work plans. Stony Brook will complete Action Plans by December 2002 for two subwatersheds (Beden Brook and Rocky Brook), and will develop Action Plans using foundation grants for three additional subwatersheds during the Project (Upper Stony Brook, Carnegie Lake and Upper Millstone). They will be a basis for implementation under this grant proposal. Information on Stony Brook's program is available at www.thewatershed.org. (See also Appendix C.)

The Proposed Project: Stony Brook and NJWSA are poised to capitalize on the completed Raritan Plan, supplemented by targeted Action Plans. The Project is founded on the principle that successful watershed protection is only possible when three strategies are used together: restoration focused on existing problems, protection and preservation of high-quality resources, and pollution prevention focused on ongoing discharges. To evaluate the effectiveness of strategies in varying land use scenarios, projects will be implemented in three areas (comprising 41% of the Basin) highlighting major land use characteristics. Table 1 provides an overview.

TABLE 1 – PROJECT OVERVIEW (Implemented continuously over three years)			
GEOGRAPHIC TARGET AREA	RESTORATION	PROTECTION & PRESERVATION	POLLUTION PREVENTION
Raritan Reservoirs Source Waters: South Branch Raritan River	<ul style="list-style-type: none"> ◆ Full stream restoration in a high priority stream of the Spruce Run Reservoir watersheds ◆ Extension of effort to at least one other tributary to South Branch Raritan 	Adoption of municipal ordinances addressing riparian area protection, stormwater management and NPS management in all 14 municipalities	<ul style="list-style-type: none"> ◆ Comprehensive implementation of Stony Brook “River Friendly” program ◆ Reduction of nutrient use in residential, commercial/ office and agricultural areas ◆ Road salting controls
Raritan/ Somerville/ Manville: Mainstem Raritan River	<ul style="list-style-type: none"> ◆ Stormwater system improvements to address turbidity at water supply intake in Bridgewater 	Adoption of municipal ordinances addressing riparian area protection, stormwater management and NPS management in all five urban municipalities	<ul style="list-style-type: none"> ◆ Comprehensive “River Friendly” program ◆ Road salting controls ◆ Targeted intervention on sites identified as Source Water risks by NJDEP
Route 1 Corridor: Millstone River Watershed	Full stream restoration in high priority streams based on the Action Plans for the Beden Brook, Rocky Brook and two other targeted watersheds	Adoption of municipal ordinances addressing riparian area protection, stormwater management, NPS management in all 26 municipalities	<ul style="list-style-type: none"> ◆ Comprehensive “River Friendly” programs targeted at a full range of landowners (residential, golf courses, business, etc.) ◆ Road salting controls
Evaluation Methods	<ul style="list-style-type: none"> ◆ Pre and post project stream monitoring during storms for TSS and turbidity upstream and downstream of each site and the full stream ◆ Pre and post Visual Assessments of streams ◆ Pre and post project macroinvertebrate and habitat monitoring ◆ Water quality monitoring at integrator site (lower portion of each subwatershed) 	<ul style="list-style-type: none"> ◆ Using population projections and available land for development, project NPS loadings through 2020 with and without new ordinances ◆ Track subdivision and site plans approved under the new ordinances, and assess NPS loads (pre and post ordinance) ◆ Water quality monitoring at integrator site (lower portion of each subwatershed) 	<ul style="list-style-type: none"> ◆ Track nutrient use changes by agricultural producers and homeowners ◆ Track local fertilizer sales ◆ Using Spruce Run Reservoir NPS loading model, assess water quality improvements based on nutrient and road salting BMP implementation ◆ Water quality monitoring at integrator site (lower portion of each subwatershed)

This Project is innovative in that it will achieve comprehensive implementation of three approaches for high priority streams, implement the watershed plans on both a broad and targeted scale, and demonstrate and evaluate implementation strategies that have been developed based on years of grassroots activity.

Restorations. While ad hoc restoration is not innovative, no New Jersey project has achieved comprehensive stabilization/restoration of eroded and impaired stream banks and riparian corridors for entire streams. This

innovative effort will do so for one or more streams in each target area, using site-appropriate non-structural techniques. Both Stony Brook and NJWSA will lead restoration projects. A draft Manual to be used to govern these projects, and an initial target list of restoration sites has been developed (see Appendix D). **Measure:** Pre and post project monitoring for TSS, turbidity, macroinvertebrate viability, and visual stream health.

Stormwater Improvements. Public water supply systems that rely on the Raritan River must treat water with significant shifts in turbidity. NJWSA will work with local governments to focus just upstream of the intake at Bridgewater, modifying stormwater outfall systems enough to reduce turbidity loadings to the stream. **Measure:** Pre and post project monitoring of stream water quality at the intakes for TSS and turbidity.

Municipal Ordinances. The goal is comprehensive adoption by all 36 municipalities within the target areas of ordinances that help protect and preserve natural resources, focusing on stream corridor, stormwater and non-point source pollution. Stony Brook will lead the evaluation of existing municipal laws and assess the goals of municipal officials, using its innovative new process. (See also the sample municipal evaluation and the stream corridor protection ordinance package in Appendix E.) Comprehensive models will be introduced, supported by legal, ecological and policy analysis. In addition, NJDEP is proposing new regulations regarding municipal stormwater plans and ordinances, which will address both stormwater quality and stormwater quantity. This Project will help ensure that adopted ordinances use Raritan Plan concepts for stream protection and flow restoration that improve upon the minimum NJDEP requirements. **Measure:** Pre and post ordinance evaluation of projected population, density, impervious cover and pollutant loading; evaluation of improved environmental performance of any completed developments within the Project time frame.

Pollution Prevention and “River Friendly” Programs. As recommended by both the Raritan Plan and the Action Plans, specific strategies to prevent pollution from major landowner categories will be implemented. Stony Brook has devised a suite of “River Friendly” programs for major businesses, golf courses, schools, citizens and farms. Through this project, these programs will be applied comprehensively for the first time. Stony Brook and NJWSA will work directly with landowners using established certification criteria that result in improved land

management practices to reduce water pollutants and ecosystem damage. (See also the “River Friendly” Business, Golf Course, and Resident Brochures in Appendix F.) In addition, existing agricultural programs such as CORE 4 are actively being used in the Raritan Basin and will be linked to this project in the South Branch Raritan focus area. Finally, a few New Jersey road departments have developed useful approaches to reducing road salt applications; these are used by few municipalities and will be promoted and implemented through this Project for comprehensive use. **Measure:** Pre and post “River Friendly” evaluation of pollutant loading reductions due to the program, particularly for nutrients from lawns and farm fields and road salting.

Budget – Stony Brook and NJWSA propose a budget (Table 2) of \$1.275 million in EPA Watershed Initiative funds, and anticipate matching funds (both in-kind and in-cash) of \$1.300 million – more than a dollar-for-dollar match! NJWSA will contribute 25% of its watershed staff’s time to the Project as match, plus cash match to involve additional project partners and purchase restoration materials and technical services. NJWSA will receive \$675,000 in Watershed Initiative funds and provide an equal match. Stony Brook will provide \$588,000 in match from its own resources, both in-kind (Executive Director and Watershed staff) and in-cash, using foundation and membership support. NJDEP is contributing \$37,500 over three years in staff time for education and outreach.

No EPA Watershed Initiative funds will be used for development of Action Plans, municipal evaluations or new or upgraded “River Friendly” programs. Though integral to success, they will be covered by matching funds.

TABLE 2 – BUDGET				
BUDGET CATEGORY	STONY BROOK	NJWSA	NJDEP	TOTAL
Salary (Federal)	\$291,169	\$248,167	0	\$539,337
Salary (In-Kind)	\$291,169	\$248,167	\$25,000	\$564,337
Fringe (Federal)	\$58,234	\$89,340		\$147,574
Fringe (In-Kind)	\$46,587	\$89,340	\$9,000	\$144,927
Indirect Costs (Federal)	\$54,493			\$54,493
Indirect Costs (In-Kind)	\$54,493	\$74,450	\$3,750	\$132,693
Contracts (Federal)	\$75,000	\$230,000	0	\$305,000
Contracts (In-Kind)	\$75,000	0	0	\$75,000
Materials (Federal)	\$120,525	\$107,493	0	\$228,018
Materials (In Kind)	\$120,525	\$263,042	0	\$383,567
Federal Total	\$599,421	\$675,000	0	\$1,274,421
In-Kind Total	\$587,774	\$675,000	\$37,750	\$1,300,524
PROJECT TOTAL	\$1,187,195	\$1,350,000	\$37,750	\$2,574,945

Monitoring and Evaluation – The project managers will provide quarterly progress reports, periodic presentations to EPA and to relevant conferences and workshops, and a final report. Each task will be assessed for budgetary and schedule compliance and for quality of output. A major problem with field monitoring, as noted in the Rural Clean Water Project and EPA's monitoring guidance for 319 projects, is that it often takes several years to compile sufficient monitoring data to provide a statistically valid assessment of project results, stream ecosystems can take two to three years to respond to habitat improvements, and field monitoring cannot readily show the benefits of actions that prevent new impacts. Therefore, as noted in Table 1, the project will integrate several types of field monitoring, modeling, BMP tracking, and estimates. Stony Brook and NJWSA propose field monitoring (biological, physical assessment and chemical) focused on restored streams and on the aggregate water quality benefits as measured at the downstream points of targeted subwatersheds. The parameters measured will be limited to major indicators (e.g., TSS, turbidity, chloride, nutrients), to reduce costs, and all data will undergo full QA/QC and be provided to NJDEP as a benefit to its 305b assessment process. Pollution prevention results can be determined by comparing actual pre- and post-project nutrient and road salting applications, with the instream benefits computed, modeled (i.e., NJWSA has a NPS loading model for the Spruce Run Reservoir watersheds) or field measured where possible. Source water risk reduction from industrial and commercial sites can be assessed based on changes in on-site practices. In addition, assessment can make use of and supplement recent USGS and Rutgers University research on the relationship between land uses and stream impairments. Monitoring will begin immediately, and will track project implementation over the project. Aspects of each approach will be implemented in each project year. NJWSA and Stony Brook expect to continue assessment beyond the project period in furtherance of the Raritan Plan and subwatershed efforts.

Connection to Other Programs – This project links well to both federal and state programs. All three focal areas provide source water to Raritan surface water supplies, include many streams listed on the Section 303d list of impaired waters, and include municipalities subject to stormwater management permits. Two of the three focal areas include extensive lands and wetlands with federal and state endangered and threatened species. Clean

Water Act (nonpoint source control, stormwater management, designated use attainment and 305b reporting), Safe Drinking Water Act (source water protection) and Endangered Species Act benefits should be realized.

Project Management: Stony Brook (George Hawkins) and NJWSA (Daniel J. Van Abs) will share primary management responsibilities for this project. NJWSA led the Raritan Project process in cooperation with NJDEP. Stony Brook was involved as a project team member and stakeholder, as was the South Branch Watershed Association. The full list of Raritan Project leaders is available at www.raritanbasin.org; most will be involved in some aspect of Raritan Plan implementation. The Raritan Plan is routinely updated to indicate commitments to implement specific strategies. Kerry Kirk Pflugh, NJDEP watershed education manager, will focus on education and outreach efforts as an in-kind contribution from NJDEP. (See also resumes for key personnel in Appendix G.) NJWSA will provide financial management and tracking for this project as an in-kind contribution.

Stony Brook-Millstone Watershed Association – George Hawkins will serve as project lead for Stony Brook. Mr. Hawkins has served as Executive Director of Stony Brook since 1997, previously was an enforcement lawyer and Senior Policy Advisory for US EPA in Region 1, and also worked as a private environmental attorney. He holds a J.D. from Harvard Law School and an A.B. from Princeton University, where he now teaches environmental law and policy. He will work closely overseeing this project with Noelle MacKay, Director of Stony Brook's Watershed Office, who will be responsible for the implementation of the Millstone River Subwatershed Action Plans, and will also take the lead regarding "River Friendly" Programs and municipal assessments and ordinances in all target areas. Staff expertise at Stony Brook includes volunteer water monitoring, streambank and riparian restorations, Subwatershed Action Plans, GIS, environmental education, "River Friendly" programs and municipal ordinances and assistance.

New Jersey Water Supply Authority – Daniel J. Van Abs will serve as project lead for NJWSA. Dr. Van Abs has been Manager of Watershed Protection Programs since 1999. He manages the Raritan Basin Watershed Management Project and represents the Authority on watershed issues. He previously was with the NJDEP for 12 years, six as manager for statewide water resources planning, and was Technical Director of the

Passaic River Coalition for four years. He holds a Ph.D. in Environmental Science from SUNY-College of Environmental Science and Forestry, is a licensed Professional Planner in New Jersey, and is a member of the American Institute of Certified Planners. The NJWSA Watershed Protection Programs office will have primary responsibility for the South Branch Watershed and Raritan/Manville/Somerville portions of the project, and will also take the lead on Source Water Protection, stormwater issues and the monitoring and evaluation system. Staff expertise in NJWSA includes water flow and quality modeling, environmental assessments, riparian area management, nonpoint source pollution control, GIS, open space planning and environmental education.

Additional Partners -- The South Branch Watershed Association will be a partner in the South Branch Raritan portion of the project, working with NJWSA on restoration projects (including coordination of volunteer stream assessments and restoration efforts), municipal ordinance adoption and stream monitoring. The project also anticipates a close working relationship with several counties that have a strong interest in watershed management, and anticipates a local partner for the Raritan/Manville/Somerville portion of the project.

Additional Technical Expertise – Consultants will be subcontracted to provide specialized support to this project regarding legal issues, training of local government officials in cutting-edge watershed management concepts, etc. Federal contracting requirements will be followed. In addition, the assistance of various federal and state agencies is anticipated as local issues arise. These latter services should add no cost to the project.

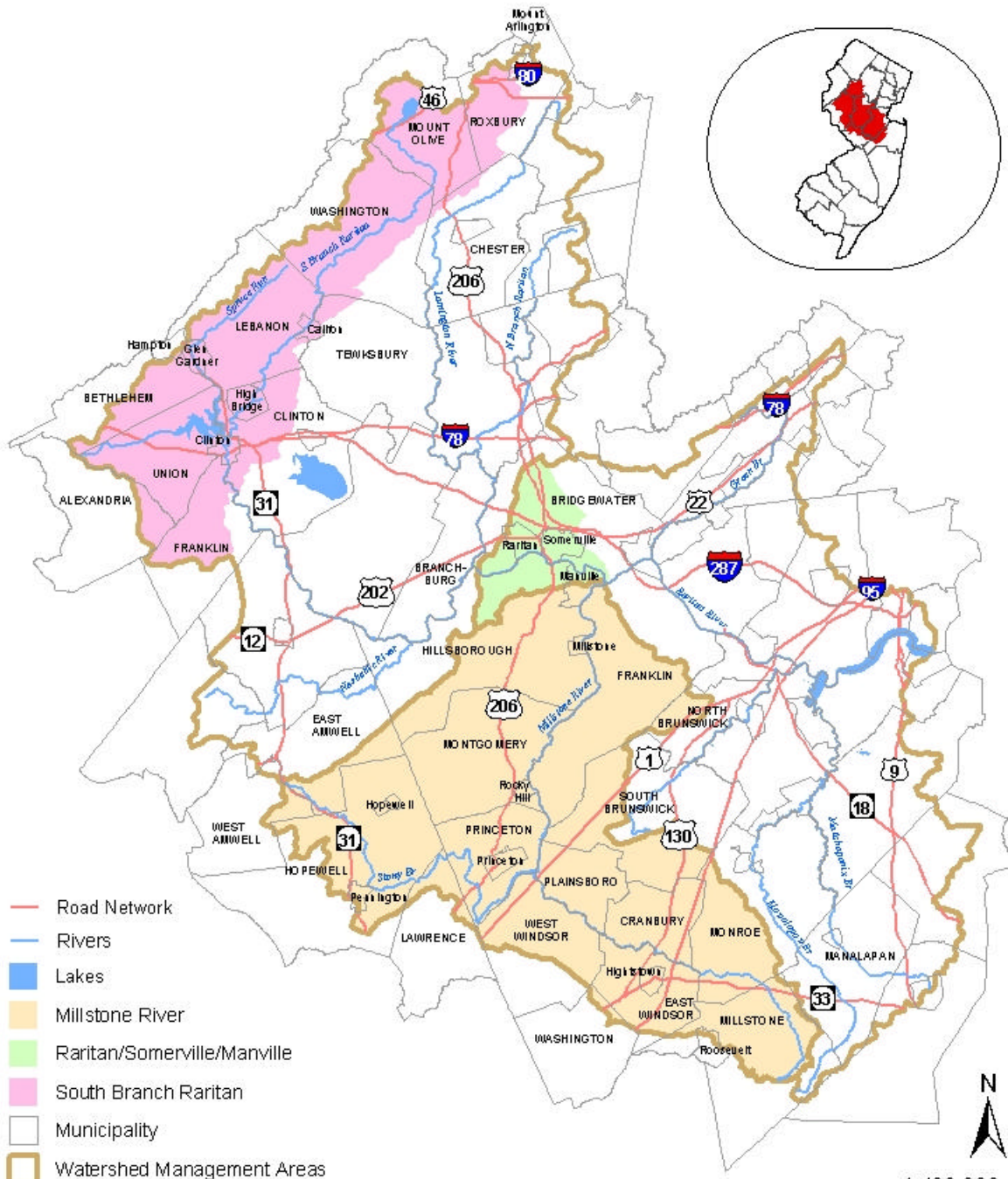
Stakeholder Involvement: The Raritan Project and the development of Subwatershed Action Plans include extensive stakeholder involvement. Stakeholders will continue to be involved in Raritan Plan implementation through a coordination process detailed in the Plan. Public involvement with restoration projects, municipal ordinance development, the “River Friendly” program, and pollution prevention efforts of this project is key to success. Both Stony Brook and NJWSA will provide extensive opportunities for stakeholder involvement, with assistance from NJDEP. In addition, all three parties will focus heavily on outreach to municipalities – experience from the Raritan Project and Stony Brook’s work show clearly that municipalities desire assistance but have little time for involvement, training or outside meetings. Direct 1:1 contact is a necessity for success.

Outreach Activities: The watershed management field is maturing, which provides many avenues for outreach within the Raritan Basin and for transferring the project results to other areas, including:

- Involvement of the public in watershed management and restoration projects developed under this proposal and through complementary projects funded by other sources
- Continuing public education through newsletters, presentations, fairs, festivals, the news media, formal education programs, and all other available venues
- Continued Internet provision of information by NJWSA, Stony Brook, NJDEP, etc.
- Provision and teaching of demonstration techniques through the Watershed Institute (see www.thewatershedinstitute.org)
- Web publication of all interim and final project results in a readily accessible format
- CD publication of all final project results for release through EPA, NJDEP, etc.
- Presentation of project results at conferences, including Watershed 2004 and 2006 and various national association conferences (e.g., AWRA, APA, WEF, AWWA), as well as state association conferences (e.g., for municipalities, counties, public engineers and planner, environmental commissioners, utility managers)
- Availability of project staff and management for visits to and from other projects
- Availability of project staff and management to researchers in watershed management and stakeholder involvement

Future Activities: In addition to stakeholder commitments to Raritan Plan implementation, Stony Brook and NJWSA specifically are committed to continued improvement in watershed management within the Raritan Basin. Both organizations will be pursuing additional implementation projects during this three-year effort, and will continue to develop and implement projects beyond 2005 as well. They also have additional projects in watershed protection using other funding sources. Monitoring of the project areas will continue beyond the project life, to improve project assessments.

Restoring and Protecting Public Water Supplies and Watershed Resources of the Raritan River Basin, NJ



Map Prepared By: NJ Water Supply Authority, November 2002
 Data Sources: NJ Department of Environmental Protection GIS